



Torrence Creek Existing Conditions: Overwide channel, bank erosion, collapsing banks, and lack of in-stream habitat. *Photo courtesy of Kimley-Horn and Associates, Inc.*

Mecklenburg County Invests in Green Infrastructure

James Gordon, Mecklenburg County, and Will Wilhelm, Kimley-Horn and Associates, Inc.

The Torrence Creek Stream Restoration project in Huntersville, North Carolina, is an example of how Mecklenburg County's investment in improving its green infrastructure continues to yield environmental, community, and financial returns. This ecological restoration will improve riparian systems that have been damaged by decades of rapid growth. Upon its completion, the planned stream, wetland, and floodplain restoration project will restore more than 7,500 linear feet of the main stem of Torrence Creek starting at McCoy Road, and 9,000 linear feet of Torrence Creek Tributary #2, from Interstate-77 to Bradford Hill Lane (at the confluence with the Torrence Creek main stem). The planning, permitting, and design stages are complete. Construction began in February 2010 and will take approximately one year.

Project Background

Torrence Creek is a sub-watershed of the McDowell Creek watershed. McDowell Creek flows into Mountain

Island Lake, Charlotte-Mecklenburg's primary source of drinking water. Rapid population growth over the last three decades in Huntersville and Cornelius has increased water pollution and stream bank erosion in the entire watershed. Sediment from construction sites and bank erosion have impaired aquatic habitat in McDowell Creek and its tributaries (including Torrence Creek), prompting the North Carolina Division of Water Quality (NC DWQ) to label the stream "impaired due to biological integrity" beginning in 2000.

To help improve this watershed, Charlotte-Mecklenburg Storm Water Services (CMSWS) completed the McDowell Creek Watershed Management Plan (2006, revised 2008). The first of its kind in Charlotte-Mecklenburg, this plan is a comprehensive, strategic roadmap for the management and restoration of surface waters in the watershed. It helps guide restoration project selection as well as individual project goals and objectives. Torrence Creek and Torrence Creek Tributary #2 were identified in the plan as top candidates for stream restoration. CMSWS also identified additional tributaries of Torrence Creek and segments of McDowell Creek as future stream restoration projects.

A greenway trail runs along the Torrence Creek main stem for 1.4 miles, and greenway trail extensions



Valley Fields Farm Stream Restoration, Davidson County, N.C.: Post-construction example of similar restoration project (Rock Cross Vane). *Photo courtesy of Kimley-Horn and Associates, Inc.*

are proposed along Torrence Tributary #2. The trail is part of the planned Torrence and Lower McDowell Creek Greenway System and fits into the overall Mecklenburg County Park and Recreation Department's Greenway Master Plan (1999-2009). CMSWS worked closely with the Park and Recreation Department to coordinate the Torrence Creek stream and wetland restoration with the planned greenway work. Trail location and stream crossings were designed to complement the restoration project and achieve the Park and Recreation Department's desired connectivity.

Restoration Goals and Objectives

The goals of the restoration project are to create a stable stream system and improve the water quality and aquatic/terrestrial habitat of the streams and floodplain of Torrence Creek and Torrence Creek Tributary #2. This will be accomplished through the following objectives:

- Remove excess nutrients and sediment from the stream by using existing and improved vegetative buffers and reconnecting the stream to a constructed floodplain or its historic floodplain.
- Increase dissolved oxygen concentration in the water using in-stream habitat structures (made of rocks and logs) and the turbulence they produce.
- Stabilize stream banks using bioengineering (native plants) and/or specific natural channel design techniques for each unique stream segment based on constraints and opportunities.
- Create aquatic habitat diversity by introducing woody habitat structures made of logs.
- Reduce water temperature by improving tree canopy and turbulence in the buffer areas.
- Control the invasive exotic plants by pre-treatment, removal during construction, and implementation of an invasive species control plan.
- Implement stormwater best management practices to stabilize stormwater outfalls.
- Improve riparian vegetative buffers to filter air pollutants and absorb carbon deposits.
- Improve aesthetics and provide the community with natural resource benefits.

Similar urban greening projects combining ecological restoration and greenway trails have proven to provide benefits to the community beyond the direct benefits to water quality and habitat. Community benefits include:

- Restoration and preservation of critical open space
- Flood reduction
- Safe alternative travel routes for pedestrians and bicyclists
- Improved plant and animal habitats
- Added economic value for adjacent properties
- Healthier water and air quality
- Better access to recreation

Funding Sources

The County leveraged multiple funding sources to conduct this green infrastructure project. The following is a list of funding sources:

- Charlotte-Mecklenburg Storm Water Services: \$603,000.
- American Recovery and Reinvestment Act (ARRA, or federal stimulus program): \$2,576,000. (The ARRA award is a loan for this “green” project. Half the amount is forgiven; the other half is to be repaid at 0% interest.)
- North Carolina Clean Water Management Trust Fund (CWMTF) Grant: \$370,000.

The Pay-Off

In 2004, CMSWS established the City of Charlotte Stream and Wetland Mitigation Bank. The Mitigation Bank’s goals include restoration, enhancement, and preservation of stream and wetland systems.

Restoration projects constructed by CMSWS generate credits that can be “banked” and used later to offset the stream and wetland impacts of City and County projects such as schools, roads, utilities, and Charlotte Douglas International Airport facilities.

Prior to the establishment of the Mitigation Bank, City and County mitigation requirements were satisfied by purchasing credits from the State without regard for where the money would be spent. By having its own Mitigation Bank, the City of Charlotte can ensure that its mitigation dollars are used to support local projects, and that the resulting benefits are realized in Mecklenburg County watersheds.

The Torrence Creek Restoration project (portions not funded by the CWMTF) will be used to generate compensatory stream and wetland mitigation credits that will be placed in the City of Charlotte Stream and Wetland Mitigation Bank. The dollar value of these credits is anticipated to meet or exceed the cost of the project, enabling the County to pay back the ARRA loan and potentially have money left over to fund future green infrastructure projects.

Finally, the County views green infrastructure projects as investments that will save capital costs on traditional (“gray”) infrastructure. By improving the water quality and quantity functions of Torrence Creek and its floodplain, the County will save money on future water treatment and stormwater management infrastructure and maintenance.